

## ON PANAX GUM.

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*Panax* is a genus of the Araliaceæ, several species of which order are more or less acrid or aromatic. But the recorded instances of gum or resin being found in any of them are extremely few, and in no case, so far as I am aware, has the composition of the exudation been dealt with, much less an analysis given.

In the common English ivy (*Hedera helix*), there is stated to be contained "the gum-resin called Hederine, used by varnish-makers, and said to be depilatory and emmenagogue." (Lindley, *Medical and Economical Botany*.)

"An aromatic gum-resin comes from *Aralia racemosa*, *spinosa*, and *hispida*. (Lindley, *Vegetable Kingdom*.)

*Meryta Sinclairii*, Seem., of New Zealand, "is charged with a peculiar resin in all its parts." (Kirk's *Forest Flora of New Zealand*.)\*

All the above quotations refer to resins or gum-resins.

We now come to *gums* in the Araliaceæ, and the two references I give are all I can find of gums in this natural order, and they both refer to *Panax*, the genus to which all the gums I have been able to obtain up to the present also belong.

"*Panax Colensoi* exudes a gum very similar to gum arabic, and occasionally used for adhesive purposes." (*Report New Zealand Exhibition*, 1865.)

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\* Since the above was written I have received from Mr. W. W. Froggatt a quantity of a gum-resin from *Astrotriche floccosa*, DC., belonging to this natural order. It has a very pleasant perfume, and appears to be an interesting substance. It exuded from sickly shrubs whose stems had been wounded by a small *Curculio*.

"*Panax sambucifolius* in Novam Angliam extendit. Truncus cum ramis gummifluus." (Mueller, *Fragm.* vii., 95.)

It would appear, therefore, that the Araliaceæ exude both gums and resins. It is a fact not generally known that the same natural order, the same genus, and even the same species may exude both a gum and a resin, and some writers have even doubted the exactness of their own observations when they have found both a gum and a resin in closely related plants. I hope to show in another place, chiefly by citing Australian instances which have come under my own notice, that the occurrence of both a resin and a gum in the same genus and even species, is by no means uncommon.

Returning to *P. sambucifolius*, I have not yet obtained gum from the normal species, but from a variety, viz., *P. sambucifolius*, var. *angusta*, or, according to Baron von Mueller's nomenclature, *P. dendroides*, var. *angusta*.

This plant is found on the banks of the Snowy River, amongst boulders of rock, attaining a height of about 8 feet, with a diameter of two inches when grown in tree shape; mostly, however, the plant is shrubby, with a number of thin stems.

The gum was obtained from old sickly plants. When obtained fresh it has a peculiar sweetish odour, and when placed in the mouth it has a pleasant flavour, reminding one strongly of a rose jujube. It dissolves wholly in the mouth in a few minutes, and except for the perfume already alluded to, it might readily be taken for one of the readily soluble Wattle gums.

Nevertheless when I first received it I was informed that in a local family it had the reputation of being injurious, and even poisonous. The gum is credited with having caused vomiting and serious symptoms which lasted three or four days in a young man who had eaten the gum as freely as one would Wattle gum.

Nothing in my analysis shows any poisonous substance in the gum, and as this is the only instance which has come under my notice of alleged poisoning by *Panax* gum, the sufferer may have been under a misapprehension. At the same time, it must be

borne in mind that vegetable substances of an injurious nature (*e.g.*, the poisonous principle in *Macrozamia* seeds) are sometimes not capable of detection by ordinary chemical processes.

My sample has the appearance of an inferior gum arabic; it breaks with a dull conchoidal fracture; the colour varies from amber to colourless.

After 24 hours in cold water a portion of the gum remained undissolved, and had swollen a good deal. After separating the solution, this insoluble substance was treated with very dilute potash; it readily dissolved, and on acidifying with acetic acid and adding alcohol, arabin was precipitated, showing the insoluble portion to have been metarabin. The gum soluble in cold water was proved to be arabin. The composition of this sample of gum is :—

Arabin	...	...	...	...	68·8
Metarabin...	...	...	...	...	16·1 (by difference)
Ash	...	...	...	...	2·0
Water	...	...	...	...	13·1
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					100·0

I have received (also from Mr. William Bäuerlen, collector for the Technological Museum) a sample of gum from *Panax murrayi*, obtained from Lindendale, Lismore, where it is known locally as "Pencil Cedar," and where it attains a height of 40-60 feet, and a stem-diameter of 9 to 24 inches. It was collected in January, 1892, and was analysed a month later.

This gum is brittle, like that of *P. sambucifolius*, var. *angusta*, and not viscous like that of *P. elegans*. Its taste is not pleasant; it has not much odour, not resembling *P. elegans* in this respect. It is fairly light in colour, although portions are as dark as ordinary glue.

In cold water it wholly dissolves to a clear transparent liquid, not opalescent like that of *P. sambucifolius*, var. The aqueous solution has an odour different from that of the others, and not so pleasant. It is difficult to describe.

On the addition of alcohol of specific gravity .834, the gum is precipitated as an opaque white substance, and is arabin. The composition of the gum is :—

Arabin	...	...	...	...	85.1
Ash	...	...	...	...	2.3
Water	...	...	...	...	12.6
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					100.0

Two specimens of gum from *Panax elegans* may now be described separately.

1. Found at Lismore. Diam., 1 foot. Height, 50-60 feet. Gum gathered April, 1891, and analysed the following February.

Both gums are rather dark in colour, and resemble Wattle gum. They are in irregular lumps of about half an inch in thickness. Both are plastic after months of keeping. Both are mainly soluble in water, the insoluble portion largely swelling up in that liquid. The odour of the aqueous solution of No. 1 sample of *P. elegans* resembles that of carrots in a remarkable degree. This is noteworthy, and reminds one of the close affinity of the Araliaceæ and Umbelliferae.

2. *Panax elegans*. Sample from Ballina, N.S.W.

This specimen has been partly described under No. 1. In aqueous solution it has an aroma which reminds one of hops.

The following analysis gives a good idea of the composition of both gums of *P. elegans*.

Arabin	...	...	...	...	70.2
Metarabin	..	...	...	...	9.8 (by difference)
Ash	...	...	...	...	3.3
Water	...	...	...	...	16.7
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					100.0

### Conclusions.

*Panax* gums closely resemble Acacia gums in composition. They both contain gums wholly soluble in cold water, and consisting entirely of arabin, and gums partially soluble in water,

though containing varying proportions of metarabin, which substance causes them to swell in cold water. The gum of *P. murrayi* would form a valuable substitute for gum arabic, and it would be a valuable minor industry for this country if it were procurable in large quantities.

All the gums possess some odour, obtained from the barks, and isolation of the odoriferous bodies could be best carried out by analysis of the bark. This odoriferous principle in the Araliaceæ, and reminding one of the Umbelliferae, has long been known. "Most of the species have a very strong smell of aniseed and celery,—hence the name of 'Celery-tree' is given to *Panax* (*Nothopanax*) *elegans* by the Queensland colonists." (Seemann, *Flora vitiensis*, 114).

The ash of *Panax* gums principally consists (in my samples) of lime, magnesium, and potassium, with a trace of iron, and although the bases were present principally as carbonates, both sulphuric and phosphoric acids were found. Quantitative determinations of the different constituents of the ash were not made, with the exception of phosphorous pentoxide, the percentage of  $P_2O_5$  in the ash of *P. elegans* being .969.

The gums may therefore be considered as principally the calcium, magnesium and potassium salts of arabic acid.